Claims

1. A bipolar plate (1) for electrochemical systems, which contains a first plate (2) with a first flowfield (2a) for media distribution as well as a second plate (3) with a second flowfield (3a) for media distribution, wherein the first plate in the region of the first flowfield at least in regions has a plane surface section (4) from which discrete projections (5) distanced to one another and arranged in a distributed manner project, characterised in that the second plate comprises channel structures (7), and the projections (5) on the first plate as well as the channel structures (7) on the second plate (3) are arranged in a manner such that a cavity (8) for introducing cooling fluid is formed between the first (2) and the second (3) plate, and the projections (5) on the first plate (2) and the corresponding channel structures (7) on the second plate (3) are designed such that the projections (5) form a cross-over of cooling fluid from a first channel (7.1) of the channel structure to a second channel (7.2) of the channel structure.

2. A bipolar plate according to claim 1, characterised in that at least the first plate (2) comprises projections (5) for distributing a fuel medium on the anode side (6.1a) of a fuel cell (6.1), and the second plate (3) of the bipolar plate (1) is designed for distributing media such as for example air or oxygen on the cathode side (6.2) of the bipolar plate (1).

3. A bipolar plate according to one of the preceding claims, characterised in that the second plate (3) comprises channel structures (7), wherein these at least in regions are designed linearly and/or groove-like and/or the second plate likewise comprises discrete projections distanced to one another.

4. A bipolar plate according to claim 3, characterised in that the channel structures (7) are designed as straight-lined channels lying next to one another.

5. A bipolar plate according to one of the claims 3 or 4, characterised in that the channel structures (7) have height differences.

6. A bipolar plate according to one of the preceding claims, characterised in that the projections are C-, I-, U-, L-, H-, X-, V-, O-shaped (Fig. 2)

7. A bipolar plate according to one of the preceding claims, characterised in that the projections (5) have a height of 0.3 to 0.7 mm, preferably 0.4 to 0.6 mm with respect to the plane surface section (4).

8. A bipolar plate according to one of the preceding claims, characterised in that the projections (5) have height differences.

9. A bipolar plate according to one of the preceding claims, characterised in that the projections (5) on the first plate (2) and the corresponding channel structures (7) on the second plate (3) are designed such that one (8.1) or several (8.1, 8.2) cooling circuits are formed in the cavity for introducing cooling fluid.

10. A bipolar plate according to one of the preceding claims, characterised in that this is of a metal such as steel, stainless steel, nickel, aluminium or titanium.

11. A bipolar plate according to one of the preceding claims, characterised in that the bipolar plate (1) is of sheet steel or stainless steel sheet.

12. A bipolar plate according to one of the preceding claims, characterised in that the material thickness of the first or second plate in each case in their unshaped sections is from 0.05 to 0.6 mm, preferably 0.075 to 0.3 mm.

13. A method for manufacturing a bipolar plate according to one of the preceding claims, characterised in that the first (2) as well as the second (3) plate are provided with projections and/or channel structures by way of roller embossing, punching, hydroforming, eddy current embossing, and subsequently the first and the second plate on the sides opposite to the channel structures and/or projections are joined to one another preferably by way of soldering, bonding or laser beam welding.

14. An electrochemical system (9) containing at least one bipolar plate according to the patent claims 1 to 12.

15. A system according to claim 14, characterised in that this is a polymer electrolyte membrane system with at least one fuel cell (6.1), wherein this at least one fuel cell consists of an electrolyte membrane which preferably has gas diffusion layers on both sides, on whose side distant to the polymer electrolyte membrane, flowfields of at least one bipolar plate (1) are arranged.

16. A system according to claim 15, characterised in that the fuel cell (6.2) on the cathode side (6.2b), with surrounding air, is self-breathing or force ventilated.

17. The use of a plate according to one of the claims 1 to 12 in an electrochemical system such as fuel cell, electrolysers and electrochemical compressors.